



## SEQUENCE LISTING

<110> Tse Wen-Chang  
Liming Yu

<120> Hybrid with Interferon-alpha and an  
Immunoglobulin Fc for Treatment of Tumors

<130> 95-2AAA

<140> 09/268,787

<141> 1999-03-16

<150> 08/994,719

<151> 1997-12-19

<150> 08/719,331

<151> 1996-09-25

<150> 08/579,211

<151> 1995-12-28

<160> 11

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1254

<212> DNA

<213> Artificial Sequence

<220>

<221> CDS

<222> (1)...(1251)

<223> recombinant sequence based on human sequences

<400> 1

|   |    |
|---|----|
| atg gcc ttg acc ttt gct tta ctg gtg gcc ctc ctg gtg ctc agc tgc | 48 |
| Met Ala Leu Thr Phe Ala Leu Leu Val Ala Leu Leu Val Leu Ser Cys |    |
| 1 5 10 15   |    |

|   |    |
|---|----|
| aag tca agc tgc tct ctg ggc tgt gat ctg cct caa acc cac agc ctg | 96 |
| Lys Ser Ser Cys Ser Leu Gly Cys Asp Leu Pro Gln Thr His Ser Leu |    |
| 20 25 30  |    |

|   |     |
|---|-----|
| ggg agc agg agg acc ttg atg ctc ctg gca cag atg agg aaa atc tct | 144 |
| Gly Ser Arg Arg Thr Leu Met Leu Leu Ala Gln Met Arg Lys Ile Ser |     |
| 35 40 45  |     |

|   |     |
|---|-----|
| ctt ttc tcc tgc ttg aag gac aga cat gac ttt gga ttt ccc cag gag | 192 |
| Leu Phe Ser Cys Leu Lys Asp Arg His Asp Phe Gly Phe Pro Gln Glu |     |
| 50 55 60  |     |

|   |     |
|---|-----|
| gag ttc ggc aac cag ttc caa aag gct gaa acc atc cct gtc ctc cat | 240 |
| Glu Phe Gly Asn Gln Phe Gln Lys Ala Glu Thr Ile Pro Val Leu His |     |
| 65 70 75 80   |     |
| gag atg atc cag cag atc ttc aat ctc ttc agc aca aag gac tca tct | 288 |
| Glu Met Ile Gln Gln Ile Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser |     |
| 85 90 95  |     |
| gct gct tgg gat gag acc ctc cta gac aaa ttc tac act gaa ctc tac | 336 |
| Ala Ala Trp Asp Glu Thr Leu Leu Asp Lys Phe Tyr Thr Glu Leu Tyr |     |
| 100 105 110   |     |
| cag cag ctg aat gac ctg gaa gcc tgt gtg ata cag ggg gtg ggg gtg | 384 |
| Gln Gln Leu Asn Asp Leu Glu Ala Cys Val Ile Gln Gly Val Gly Val |     |
| 115 120 125   |     |
| aca gag act ccc ctg atg aag gag gac tcc att ctg gct gtg agg aaa | 432 |
| Thr Glu Thr Pro Leu Met Lys Glu Asp Ser Ile Leu Ala Val Arg Lys |     |
| 130 135 140   |     |
| tac ttc caa aga atc act ctc tat ctg aaa gag aag aaa tac agc cct | 480 |
| Tyr Phe Gln Arg Ile Thr Leu Tyr Leu Lys Glu Lys Lys Tyr Ser Pro |     |
| 145 150 155 160   |     |
| tgt gcc tgg gag gtt gtc aga gca gaa atc atg aga tct ttt tct ttg | 528 |
| Cys Ala Trp Glu Val Val Arg Ala Glu Ile Met Arg Ser Phe Ser Leu |     |
| 165 170 175   |     |
| tca aca aac ttg caa gaa agt tta aga agt aag gaa gag tcc aaa tat | 576 |
| Ser Thr Asn Leu Gln Glu Ser Leu Arg Ser Lys Glu Glu Ser Lys Tyr |     |
| 180 185 190   |     |
| ggg ccc ccg tgc cca tca tgc cca gca cct gag ttc ctg ggg gga cca | 624 |
| Gly Pro Pro Cys Pro Ser Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro |     |
| 195 200 205   |     |
| tca gtc ttc ctg ttc ccc cca aaa ccc aag gac act ctc atg atc tcc | 672 |
| Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser |     |
| 210 215 220   |     |
| cgg acc oct gag gtc acg tgc gtg gtg gtg gac gtg agc cag gaa gac | 720 |
| Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp |     |
| 225 230 235 240   |     |
| ccc gag gtc cag ttc aac tgg tac gtg gat ggc gtg gag gtg cat aat | 768 |
| Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn |     |
| 245 250 255   |     |
| gcc aag aca aag ccg cgg gag gag cag ttc aac agc acg tac cgt gtg | 816 |
| Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val |     |
| 260 265 270   |     |
| gtc agc gtc ctc acc gtc ctg cac cag gac tgg ctg aac ggc aag gag | 864 |
| Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu |     |

| 275   | 280 | 285 |      |
|---|-----|-----|------|
| tac aag tgc aag gtc tcc aac aaa ggc ctc ccg tcc tcc atc gag aaa |     |     | 912  |
| Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys |     |     |      |
| 290   | 295 | 300 |      |
| acc atc tcc aaa gcc aaa ggg cag ccc cga gag cca cag gtg tac acc |     |     | 960  |
| Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr |     |     |      |
| 305   | 310 | 315 | 320  |
| ctg ccc cca tcc cag gag gag atg acc aag aac cag gtc agc ctg acc |     |     | 1008 |
| Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr |     |     |      |
| 325   | 330 | 335 |      |
| tgc ctg gtc aaa ggc ttc tac ccc agc gac atc gcc gtg gag tgg gag |     |     | 1056 |
| Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu |     |     |      |
| 340   | 345 | 350 |      |
| agc aat ggg cag ccg gag aac aac tac aag acc acg cct ccc gtg ctg |     |     | 1104 |
| Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu |     |     |      |
| 355   | 360 | 365 |      |
| gac tcc gac ggc tcc ttc ttc ctc tac agc agg ctg acc gtg gac aag |     |     | 1152 |
| Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys |     |     |      |
| 370   | 375 | 380 |      |
| agc agg tgg cag gag ggg aat gtc ttc tca tgc tcc gtg atg cat gag |     |     | 1200 |
| Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu |     |     |      |
| 385   | 390 | 395 | 400  |
| gct ctg cac aac cac tac aca cag aag agc ctc tcc ctg tct ctg ggt |     |     | 1248 |
| Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly |     |     |      |
| 405   | 410 | 415 |      |
| aaa tag   |     |     | 1254 |
| Lys   |     |     |      |

&lt;210&gt; 2

&lt;211&gt; 417

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> artificial peptide sequence based on human  
sequence

&lt;400&gt; 2

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ala | Leu | Thr | Phe | Ala | Leu | Leu | Val | Ala | Leu | Leu | Val | Leu | Ser | Cys |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |
| Lys | Ser | Ser | Cys | Ser | Leu | Gly | Cys | Asp | Leu | Pro | Gln | Thr | His | Ser | Leu |
|     |     |     | 20  |     |     |     | 25  |     |     |     |     |     | 30  |     |     |
| Gly | Ser | Arg | Arg | Thr | Leu | Met | Leu | Leu | Ala | Gln | Met | Arg | Lys | Ile | Ser |
|     |     |     | 35  |     |     |     | 40  |     |     |     |     | 45  |     |     |     |

```

Leu Phe Ser Cys Leu Lys Asp Arg His Asp Phe Gly Phe Pro Gln Glu
 50                      55                      60
Glu Phe Gly Asn Gln Phe Gln Lys Ala Glu Thr Ile Pro Val Leu His
 65                      70                      75                      80
Glu Met Ile Gln Gln Ile Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser
                      85                      90                      95
Ala Ala Trp Asp Glu Thr Leu Leu Asp Lys Phe Tyr Thr Glu Leu Tyr
                      100                      105                      110
Gln Gln Leu Asn Asp Leu Glu Ala Cys Val Ile Gln Gly Val Gly Val
                      115                      120                      125
Thr Glu Thr Pro Leu Met Lys Glu Asp Ser Ile Leu Ala Val Arg Lys
 130                      135                      140
Tyr Phe Gln Arg Ile Thr Leu Tyr Leu Lys Glu Lys Lys Tyr Ser Pro
 145                      150                      155                      160
Cys Ala Trp Glu Val Val Arg Ala Glu Ile Met Arg Ser Phe Ser Leu
                      165                      170                      175
Ser Thr Asn Leu Gln Glu Ser Leu Arg Ser Lys Glu Glu Ser Lys Tyr
                      180                      185                      190
Gly Pro Pro Cys Pro Ser Cys Pro Ala Pro Glu Phe Leu Gly Gly Pro
                      195                      200                      205
Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser
 210                      215                      220
Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser Gln Glu Asp
 225                      230                      235                      240
Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
                      245                      250                      255
Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn Ser Thr Tyr Arg Val
                      260                      265                      270
Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu
 275                      280                      285
Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro Ser Ser Ile Glu Lys
 290                      295                      300
Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr
 305                      310                      315
Leu Pro Pro Ser Gln Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr
                      325                      330                      335
Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu
                      340                      345                      350
Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu
 355                      360                      365
Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Arg Leu Thr Val Asp Lys
 370                      375                      380
Ser Arg Trp Gln Glu Gly Asn Val Phe Ser Cys Ser Val Met His Glu
 385                      390                      395                      400
Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Leu Gly
                      405                      410                      415
Lys

```

&lt;210&gt; 3

&lt;211&gt; 2

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> artificial peptide linker sequence

<400> 3

Gly Ser

1

<210> 4

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> artificial peptide linker sequence

<400> 4

Gly Gly Ser Gly Gly Gly Ser

1

5

<210> 5

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> artificial peptide linker sequence

<400> 5

Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser

1

5

10

<210> 6

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> artificial peptide linker sequence

<400> 6

Gly Gly Gly Ser Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly

1

5

10

15

Ser

<210> 7

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> artificial peptide linker sequence

<400> 7

Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly

1

5

10

15

Gly Ser Gly Gly Gly Ser  
20

<210> 8  
<211> 30  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> artificial peptide linker sequence

<400> 8  
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly  
1 5 10 15  
Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser  
20 25 30

<210> 9  
<211> 40  
<212> PRT  
<213> artificial sequence

<220>  
<223> artificial peptide linker sequence

<400> 9  
Gly Gly Gly Ser Gly Gly Gly Ser Gly Gly Gly Gly Gly Ser Gly Gly  
1 5 10 15  
Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly  
20 25 30  
Gly Gly Ser Gly Gly Gly Gly Ser  
35 40

<210> 10  
<211> 6  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> artificial peptide linker sequence

<400> 10  
Gly Gly Ser Gly Gly Ser  
1 5

<210> 11  
<211> 16  
<212> PRT  
<213> artificial sequence

<220>  
<223> artificial peptide linker sequence

<400> 11  
Gly Gly Ser Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Ser

1

5

10

15